13. (Unamended From Previous Version) The process for producing a liquid jet recording head according to claim 12, wherein the coating resin layer is formed from a photosensitive resin, and the discharge opening is formed by photolithography.

14. (Unamended From Previous Version) The process for producing a liquid jet recording head according to claim 12, wherein the discharge opening is formed by oxygen plasma etching.

15. (Unamended From Previous Version) The process for producing a liquid jet recording head according to claim 12, wherein the discharge opening is formed by excimer laser irradiation.

REMARKS

This application has been carefully reviewed in light of the Office Action dated April 2, 2002 (Paper No. 30). Claims 1, 2 and 4 to 15 are pending, with Claims 1 and 11 being the independent claims. Reconsideration and further examination are respectfully requested.

Claims 1, 2 and 4 to 15 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,478,606 (Ohkuma) in view of U.S. Patent No. 5,166,265 (Nakahata). Reconsideration and withdrawal of the rejection is respectfully requested.

The present invention, as recited by Claim 1, concerns a liquid jet recording head comprising a liquid flow path having a coating resin layer. The present invention, as recited by Claim 11, concerns a process for producing a liquid jet recording head wherein a

coating resin layer is formed. The coating resin layer is formed from a cured product of a resin composition comprising (1) a curable epoxy compound, (2) a compound having a functional group reactive to the curable epoxy compound and fluorocarbon moiety, and (3) a curing agent. Components (1) and (2) are polymerized. According to the process of Claim 11, an ink flow path pattern is formed from a soluble resin on an ink discharge pressure generating element on a base plate; the coating resin layer is formed on the soluble resin layer; and the soluble resin layer is removed by elution to form an ink flow path. As recited by both Claims 1 and 11, the coating resin layer facilitates the smooth flow of ink through the liquid flow path.

The Office Action concedes that Ohkuma does not disclose the feature of a compound having a functional group reactive to a curable epoxy compound and a fluorocarbon moiety. The Office Action relies on Nakahata for this feature.

However, according to Nakahata, his resin composition is "outstanding in water repellency." See col. 49, lines 33 to 41. Nakahata expresses water repellency in terms of the angle at which the coating surface is in contact with water. See. col. 66, lines 41 to 49. In each of Nakahata's embodiments, the contact angle is greater than 80. See Tables 5 to 7. Nakahata distinguishes the property of water repellency from the property of water resistance, which refers to the ability of his coat to withstand water absorption. Nakahata measures water resistance in five grades, the highest grade representing no observation of blistering or change in gloss. See col. 66, lines 19 to 27.

It is Applicants' understanding that if a coating resin layer having high water repellency (i.e, high contact angle) were used in a liquid flow path, liquid bubbles of

ink would be more likely to form on the inner walls of the flow path. These bubbles would inhibit the smooth flow of ink through the flow path.

It is fundamental that a prior art reference must be considered in its entirety, i.e, as a whole, including portions that would lead away from the claimed invention. See MPEP § 2141.02. Nakahata teaches a composition having high water repellency, a property which would inhibit the smooth flow of ink through an ink flow path. This is in direct contrast to the present invention, which recites that the coating resin layer facilitates the smooth flow of ink through the ink flow path. As a consequence, those of ordinary skill would not contemplate the use of Nakahata's composition in a liquid jet recording head.

Moreover, no motivation is seen for using Nakahata's composition in Ohkuma's ink jet head. Nakahata nowhere mentions that it might be suitable in an ink environment or in an ink jet head. Indeed, as shown above, Nakahata's disclosed composition would not be suitable, because of its high water repellency. In addition, columns 49 and 50 of Nakahata, which were cited in the Office Action in support of motivation, mention water repellency only in the context of "automobile panels", a field which is far different and not applicable to the liquid jet recording head contemplated by the inventors herein. Applicants therefore conclude that any permissible combination of Nakahata and Ohkuma would not teach or suggest the claimed invention. It is therefore respectfully requested that the Section 103 rejection be withdrawn.

No other matters being raised, it is believed that the entire application is fully in condition for allowance, and such action is courteously solicited.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Four Times Amended) A liquid jet recording head comprising:

a liquid flow path having a coating resin layer formed from a cured product of a resin composition comprising (1) a curable epoxy compound, (2) a compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety, and (3) a curing agent,

wherein the curable epoxy compound and the compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety are polymerized, and

wherein the coating resin layer facilitates a smooth flow of ink through the liquid flow path [compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety is contained in the resin composition at a content ranging from 5% to 50% by weight].

11. (Three Times Amended) A process for producing a liquid jet recording head, comprising the steps of:

(I) forming a liquid [an ink] flow path pattern from a soluble resin on an ink discharge pressure-generating element on a base plate,

(II) forming a coating resin layer on the soluble resin layer, and

(III) removing the soluble resin layer by elution to form a liquid flow path, wherein the coating resin layer is formed from a cured product of a resin composition comprising (1) a curable epoxy compound, (2) a compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety, and (3) a curing agent,

wherein the curable epoxy compound and the compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety are polymerized, and

wherein the coating resin layer facilitates a smooth flow of ink through the liquid flow path [compound having a functional group reactive to the curable epoxy compound and a fluorocarbon moiety is contained in the resin composition at a content ranging from 5% to 50% by weight].